

IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-21. (Canceled)

22. (New) A method of conditioning and removing scale and deposits within a heat exchange system that utilizes at least one heat transfer liquid, the method comprising:
taking the heat exchange system out of service;
providing in the heat exchange system an aqueous cleaning solution of a scale conditioning agent, the scale conditioning agent comprising a chelant, the chelant being present in the aqueous cleaning solution at a treatment concentration of less than about 1 weight percent;
removing substantially all of the aqueous cleaning solution from the heat exchange system after a treatment period; and
returning the heat exchange system to service.

23. (New) The method of claim 22, further comprising:
before providing in the heat exchange system the aqueous cleaning solution, removing at least a portion of the heat transfer liquid from the heat exchange system; and
after removing substantially all of the aqueous cleaning solution from the heat exchange system, introducing replacement heat transfer liquid.

24. (New) The method of claim 22, wherein the scale conditioning agent further comprises a reducing agent.

25. (New) The method of claim 24, wherein the scale conditioning agent further comprises a pH control agent.

26. (New) The method of claim 25, further comprising maintaining the aqueous cleaning solution at a treatment pH of between pH 3.5 and pH 9 during the treatment period.

27. (New) The method of claim 26, wherein the treatment pH is between pH 4.5 and pH 6.
28. (New) The method of claim 25, wherein the scale conditioning agent further comprises a non-ionic surfactant.
29. (New) The method of claim 25, wherein:
the chelant comprises at least one chelant selected from a group consisting of EDTA, HEDTA, lauryl substituted EDTA, and polyaspartic acid with imminodisuccinate;
the reducing agent comprises at least one reducing agent selected from a group consisting of ascorbic acid, isomers of ascorbic acid, citric acid, hydrazine, catalyzed hydrazine, and carbohydrazide; and
the pH control agent is a nitrogen containing aliphatic compound having fewer than 10 carbons such as triethanolamine, dimethylamine, ethylamine, 1,2-diaminoethane, diaminopropane, ethanolamine, diethanolamine, 2-methyl-2-amono-1-propanol, 5-aminopentanol, or methoxypropylamine.
30. (New) The method of claim 22, wherein providing in the heat exchange system the aqueous cleaning solution of a scale conditioning agent comprises introducing the aqueous cleaning solution into the heat exchange system.
31. (New) The method of claim 22, wherein providing in the heat exchange system the aqueous cleaning solution of a scale conditioning agent comprises forming the aqueous cleaning solution in the heat exchange system.
32. (New) The method of claim 22, further comprising, prior to removing substantially all of the aqueous cleaning solution from the heat exchange system, circulating the aqueous cleaning solution within the heat exchange system during the treatment period.
33. (New) The method of claim 32, further comprising introducing additional scale conditioning agent during the circulating the aqueous cleaning solution.

34. (New) The method of claim 33, wherein the additional scale conditioning agent is introduced into the heat exchange system as a concentrated premix solution, the introduction of the additional scale conditioning agent being sufficient to maintain the chelant at the treatment concentration.

35. (New) The method of claim 22, further comprising maintaining the aqueous cleaning solution at a treatment temperature of less than 100°C during the treatment period.

36. (New) The method of claim 35, wherein the treatment temperature is less than 60°C.

37. (New) The method of claim 22, further comprising agitating the aqueous cleaning solution during the treatment period.

38. (New) The method of claim 37, wherein the agitating the aqueous cleaning solution comprises flow induced mixing, inert gas sparging, or a combination of the two methods.

39. (New) The method of claim 22, wherein the treatment concentration is between 0.05 and 0.25 weight percent.

40. (New) The method of claim 22, further comprising, before returning the heat exchange system to service,
introducing an aqueous rinse solution into the heat exchange system;
performing at least one hydro-mechanical cleaning operation; and
removing substantially all of the aqueous rinse solution; and
introducing replacement heat exchange liquid into the heat exchange system.

41. (New) The method according to claim 22, wherein the heat exchange system comprises a steam generator.

42. (New) The method according to claim 22, wherein the steam generator comprises a nuclear steam generator.

43. (New) The method according to claim 22, wherein the method induces corrosion of less than 0.001 inch per application in carbon and low alloy steels.

44. (New) The method according to claim 22, further comprising increasing a porosity of deposits in the heat exchange system before removing substantially all of the aqueous cleaning solution from the heat exchange system.

45. (New) The method according to claim 22, further comprising releasing the used aqueous cleaning solution into the environment.

46. (New) A method of conditioning and removing scale and deposits within a heat exchange system that utilizes at least one heat transfer liquid, the method comprising:
taking the heat exchange system out of service;
providing in the heat exchange system an aqueous cleaning solution of a scale conditioning agent, the scale conditioning agent comprising a chelant;
removing substantially all of the aqueous cleaning solution from the heat exchange system after a treatment period;
returning the heat exchange system to service; and
between taking the heat exchange system out of service and returning the heat exchange system to service, inducing corrosion of less than 0.001 inch in carbon and low alloy steels.

47. (New) The method according to claim 46, wherein, between taking the heat exchange system out of service and returning the heat exchange system to service, the inducing corrosion comprises inducing corrosion of between 0.0002 and 0.0003 inch in carbon and low alloy steels.

48. (New) The method according to claim 46, further comprising increasing a porosity of deposits in the heat exchange system before removing substantially all of the aqueous cleaning solution from the heat exchange system.

49. (New) The method according to claim 46, further comprising releasing the used aqueous cleaning solution into the environment.

50. (New) A method of conditioning and removing scale and deposits within a heat exchange system that utilizes at least one heat transfer liquid, the method comprising:
taking the heat exchange system out of service;
providing in the heat exchange system an aqueous cleaning solution of a scale conditioning agent, the scale conditioning agent comprising a chelant;
increasing a porosity of deposits in the heat exchange system;
removing substantially all of the aqueous cleaning solution from the heat exchange system; and
returning the heat exchange system to service.

51. (New) A method of conditioning and removing scale and deposits within a heat exchange system that utilizes at least one heat transfer liquid, the method comprising:
taking the heat exchange system out of service, the heat exchange system comprising a nuclear steam generator;
providing in the heat exchange system an aqueous cleaning solution of a scale conditioning agent, the scale conditioning agent comprising a chelant;
removing substantially all of the aqueous cleaning solution from the heat exchange system; and
releasing the used aqueous cleaning solution into the environment.